

## Public policy for open innovation

**Citation for published version (APA):**

Santos., A. B., Bogers, M. L. A. M., Norn, M. T., & Mendonca, S. (2021). Public policy for open innovation: Opening up to a new domain for research and practice. *Technological Forecasting and Social Change*, 169, Article 169. <https://doi.org/10.1016/j.techfore.2021.120821>

**Document license:**

TAVERNE

**DOI:**

[10.1016/j.techfore.2021.120821](https://doi.org/10.1016/j.techfore.2021.120821)

**Document status and date:**

Published: 01/08/2021

**Document Version:**

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

**Please check the document version of this publication:**

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.tue.nl/taverne](http://www.tue.nl/taverne)

**Take down policy**

If you believe that this document breaches copyright please contact us at:

[openaccess@tue.nl](mailto:openaccess@tue.nl)

providing details and we will investigate your claim.

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

# Technological Forecasting & Social Change

journal homepage: [www.elsevier.com/locate/techfore](https://www.elsevier.com/locate/techfore)

## Editorial

### Public policy for open innovation: Opening up to a new domain for research and practice



#### 1. Introduction

Open Innovation (OI) emerged as one of the most important research topics in management and economics literature in the last decades, especially when understanding research and change phenomena (Martin 2012, 2019). The concept, originally advanced by Chesbrough (2003), reflects and articulates changes of the global learning economy emerging from the development of digital technologies, ubiquitous innovation, intellectual labour mobility, and the growth of markets for knowledge resources and processes. More recently, Chesbrough and Bogers (2014: 17) redefined OI as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries” in which the implied notion of the business model could apply to a multitude of organisations and assume a variety of forms (cf. Carça et al., 2009; Zott et al., 2011). OI has been analysed in different dimensions, such as inside-out and outside-in knowledge flows, across levels of analysis (not only company level, but also individual and ecosystem level), and from different perspectives (such as regional/territorial and national/international) (Bogers et al., 2017; Dahlander and Gann, 2010; West et al., 2014).

OI is also a hot topic in actual business life, with a growing number of companies adopting a more fluid approach, namely what concerns to the knowledge valorisation and collaborative innovation practices. Research has accordingly also put a lot of attention on corporate aspects of OI with a particular focus on how to leverage external knowledge, management of OI networks, and the role of users and communities in OI (Randhawa et al., 2016; Vanhaverbeke et al., 2014; West and Bogers, 2014). Even though it may constitute an important boundary condition for OI practices, there has been a reasonably limited focus on the role of public policies in OI (Bogers et al., 2018; de Jong et al., 2010; Santos, 2016). Nevertheless, recent studies show that the adoption of OI can be stimulated through the existence of public policies favourable to a context of knowledge sharing, collaborative R&D and innovation, knowledge exploitation and valorisation, mobility and qualification of human resources or supporting innovative ideas (Beck et al., 2020; Masucci et al., 2020; Mina et al. 2014; etc.).

All-in-all, a more elaborate focus on the role of public policy in OI is merited, and this is what this special issue provides. Pro-OI innovation policy can be understood as a general posture and the deployment of a specific set of instruments that seek to keep learning processes distributed and knowledge transfers unhurdled, while ensuring self-intended behaviours do not compromise the expansion of effective opportunities for the broader societal constituents. In this special issue the papers extend the portfolio of insights in a variety of ways.

The papers included in this special issue illustrate the breadth of

roles that public policy can play in promoting OI practices and in the possible initiatives and instruments that can be applied to this end. The papers also hint at some of the challenges facing public policy to strengthen OI, e.g. with a view of measuring desired OI activities and effects, dealing with local and contextual factors that affect OI-related outcomes, and selecting and reaching appropriate target-actors (SMEs, business accelerators, public research institutes, universities) and contexts (science parks, clusters, regions) with the potential to engage in OI practices but with little or no current practices to build on. We learn that there is great scope for further research to help policymakers navigate the landscape of possible OI-promoting policies and actions and in supporting the design and implementation of effective public policy for OI.

#### 2. Synopsis of the articles in the special issue

This special issue features mobilises research and advances in public policy design and practice that can influence the adoption of OI approaches by diverse societal and economic players in years to come. Around 30 papers were received and peer-reviewed, out of which 14 papers were selected for publication. These papers cover themes such as regional and place-based policy, open science, and public incentives for knowledge-driven cooperation. They also reflect the growing reality of OI in different geographic locations, including South America, and the Far East. With different actors and different systems of innovation comes a variety of shapes and flavours in which the OI trend might be appreciated, and this is a major contribution of this Special Issue: harnessing the rich bouquet of concerns and solutions that are flourishing in different types of players and in different parts of the world. However, the papers also yield safeguards to what we would call the “openness fix”: policy analysis and clear rationales (an even an appropriate *ethos*) must be deployed together with OI ideas so as provide meaningful, effective and sound basis for intervention. The papers assembled in this Special Issue are organised around four thematic streams, emphasising smaller firms, innovation systems, intervention mechanisms, and academic settings.

The first set of three papers discuss the role of public policies in promoting OI in SMEs, at different levels. While OI practices are often associated with large companies, the first of these papers draws attention to the possible value of OI for smaller firms. In the paper “*Measuring Open Innovation practices in Small Companies at important Brazilian industrial centres*”, Rosa et al. (2020) present the results of a survey conducted amongst 77 small technology-based enterprises incubated at prominent Brazilian industrial and technological centres. They conclude that small companies *do* employ OI practices, and that these practices

<https://doi.org/10.1016/j.techfore.2021.120821>

Available online 27 April 2021

0040-1625/© 2021 Elsevier Inc. All rights reserved.

are associated with greater sharing of information about products, services and products, pointing to a potential role for public policy in promoting greater uptake of OI practices by smaller firms. This paper also proposes a set of indicators for measuring OI at small firms, thus contributing to ongoing efforts in research and policy circles alike to continually improve methods for measuring OI. [Oguguo et al. \(2020\)](#) in the paper “*Multilevel institutional analyses of firm benefits from R&D collaboration*” explore how the national institutional context influences the benefits a firm may derive from R&D collaborations. Relying on multilevel analyses of data on 601 European firms that participated in the EU’s FP7 program, the authors found that in countries where collaboration logics have been fostered by the design of policy mix for business R&D and by the diffusion of knowledge-revealing practices, firms attain greater product development benefits and, to a lesser extent, greater organizational benefits (e.g. reorganised work and process structures) from R&D collaboration. Moreover, the firms that experienced greater benefits from participating in sponsored collaboration are those that operate in countries where public R&D support is provided mostly through direct grants (rather than tax incentives), and where the publication of collaborative knowledge outcomes is relatively more widespread. Finally, in the paper “*Local open innovation: A means for public policy to increase collaboration for innovation in SMEs*”, [Leckel et al. \(2020\)](#) analyse OI at the regional level, putting the focus on how public policy can effectively increase collaboration for innovation amongst firms, entrepreneurs, research institutions and the public sector. The paper describes Canadian experiences with Local Open Innovation (LOI), a public policy initiative to develop regional networks while drawing on OI approaches (notably broadcast search) to help regional stakeholders address concrete innovation goals through collaborative problem-solving. The authors find that LOI are effective as a public policy tool to promote the use of OI practices amongst small firms that tend to be locally embedded, by offering an accessible means for productive actors to engage in, and benefit from, distant search, while at the same time contributing to the development of a diverse regional innovation system.

The second set includes four papers that analyse how public policy can promote OI within innovation systems at various levels, including the country and cluster levels. [Lee et al. \(2020\)](#), in the paper “*Open innovation at the national level: Towards a global innovation system*”, argue that countries may adopt OI strategies at a national level to support international technology collaboration. A multi-level strategic framework that helps a country to develop a collaboration strategy with another country at three different levels is proposed. Potential partner countries are assessed with respect to attractiveness at the macro-level (market and technology attractiveness), closeness at the meso-level (degree of existing relationships between the two countries), and strategy at the micro-level (collaboration targets and modes). Meanwhile, [Vlaisavljevic et al. \(2020\)](#) address in “*The role of policies and the contribution of clusters’ agencies in the development of biotech open innovation ecosystem*” the role of cluster policy in the development of OI ecosystems. By bringing together OI and cluster approaches, this research describes how innovation ecosystems contribute to the development of different patterns of OI in a geography-sensitive lenses. Particularly, the paper addresses the role of the cluster policies and their implementation through cluster-orientated public agencies in fostering OI in a Spanish biotech cluster. The study shows that the effects of cluster policies on patterns of open innovation in different regional contexts is not uniform but depends on the characteristics of the context in which they are implemented. The effects of cluster policies can be diluted by aspects of the regional innovation ecosystem, including e.g. path dependencies, underlining the importance of developing region-specific cluster and innovation policies, designed to suit features of a given regional system. The third paper of this set is presented by [Pustovrh et al. \(2020\)](#) who focus on “*The role of open innovation in developing an entrepreneurial support ecosystem*”. The OI paradigm is used to analyse the development of an entrepreneurial support ecosystem and the paper suggests that, in

environments that have underdeveloped entrepreneurial support ecosystems, public policy should endorse the OI activities of key actors in entrepreneurial ecosystems. By harnessing OI, a business accelerator can forge a broader network of relationships with actors outside of the system, which in turn will increase the innovation capacity within the system and embed it within a global innovation system. In “*Open innovation in science parks: The role of public policies*”, [Silva et al. \(2020\)](#) turn our attention to the role of science parks in promoting OI, and in the role played by public policies in this process. Based on a qualitative study of five science parks in Brazil and Portugal, the authors conclude that science parks can promote OI by spontaneity-inducing mechanisms, deliberate actions, and public policies vectors, and that public policies can promote OI in science parks, both directly and indirectly.

Balances and checks have to be considered when promoting OI, these being the theme of five other papers. The first, by [Cheah and Ho \(2020\)](#) examine how the implementation of industrial policy through public R&D funding impacts the outcome of OI collaboration between public research institutes and firms. In their paper “*Effective industrial policy implementation for open innovation: The role of government resources and capabilities*”, they found that funding resources significantly and positively influence projects’ innovation collaboration outcomes. They conclude that public research institutes’ top management ability to govern project management portfolio processes partially mediates the conversion of project funding resources into innovation collaboration outcomes. The second paper of this set is brought by [Ahn et al. \(2020\)](#), with the title “*Do government R&D subsidies stimulate collaboration initiatives in private firms?*”. This paper analyses the effect of R&D incentives in stimulating firms’ inclination to collaborate shows that R&D subsidies stimulate firms to choose partners more adventurously, i.e. by going outside the traditional value chains and regional boundaries. However, the impact in highly funded firms was smaller than in firms that received a more modest amount, which that a push toward more heterogeneous range of partners has to be submitted to the standard checks of policy intervention (hubris is no substitute to a well-documented rationale). This study also suggests that different policy impacts, such as input and behavioural additionality, can occur simultaneously and even influence each other, presenting an argument for policy makers to develop more sophisticated policy tools for OI promotion. A new perspective of public European incentives is put forth by [De Marco et al. \(2020\)](#) with “*European SMEs’ engagement in open innovation: When the important thing is to win and not just to participate, what should innovation policy do?*”. This exploratory study proposes an original methodology to operationalise and signal SMEs’ engagement in challenging dimensions of implementing OI. The paper examines whether the European SME Instrument is achieving its goal of providing public funds to the best SMEs in Europe, the so-called ‘EU Innovation Champions’. The study shows that – contrary to the aims of the instrument – SMEs who are awarded a grant are less engaged in the challenging dimensions of OI than companies that did not receive any funding. This paper provides recommendations for the design of more effective instruments, e.g. redefining the target group for the instrument to better capture either actual ‘EU Innovation Champions’, and to develop more comprehensive evaluation procedures for companies applying for grants. The fourth paper of this set is from [Mendonça & Reis \(2020\)](#), with the title “*Exploring the mechanisms of gender effects in user innovation.*” The paper looks at users’ probability to innovate in terms of gender, investigating direct and indirect effects through fields of education and personality traits, such as risk taking, innovativeness and aspirations. Based on Portuguese data, the paper concludes that although men innovate more, female innovators behave similarly to male innovators, showing no clear differences on innovation patterns. The paper also finds that gender has a direct effect on the probability of users to innovate and an indirect effect on user innovation through education fields, but that the direct effect of gender on innovation is stronger. The authors stress that these findings may indicate an underutilized innovation potential amongst women, calling for policies aimed at strengthening the participation of women in innovative

activities. The last paper in this set is from [Jugend et al. \(2020\)](#), focusing on “Public support for innovation: A systematic review of the literature and implications for open innovation”. This paper analyses what types of public practices for innovation comprise the term “public support for innovation” and its relationship with OI based on a systematic review of the preceding seven years of academic publications on this topic. The authors conclude that the use of the term “public support for innovation” is emerging in innovation management and innovation policies, and that OI is the main management theory used to analyse public support for innovation. They also identify and describe differences in research approaches that focus on “innovation policy” and “public support for innovation.”

A final set of papers includes two contributions focusing on the relationships between open science, open source, and OI. The research from [Vicente-Saez et al. \(2020\)](#) focuses on open science policies and practices to expand the ethos of science and innovation at universities. Their paper “The dawn of an open exploration era: Emergent principles and practices of open science and innovation of university research teams in a digital world” provide directions for how to advance openness in science at universities and illustrate how openness in innovation is being remodelled by open science practices. The authors propose an open exploration policy and a governance model for open science and innovation at universities in a digital world with the ultimate aim of accelerating research and innovation processes through increased adoption of open science and innovation processes. The second paper of this set, from [Heikkinen et al. \(2020\)](#), focuses their research at national level. Looking “Towards national policy for open source hardware research: A case study of Finland”. The paper provides an analysis of the strategic national benefit of applying the free and open-source hardware (FOSH) approach to major research equipment for any nation. The results show net saving directly on scientific equipment purchases if research hardware is converted to FOSH, and that FOSH-adopting nations would likely garner the well-established concomitant benefits of increased research innovation within their economy. The paper proposes a detailed generalised model for determining national research policy in hardware development is derived and research policy mechanisms for accelerating FOSH deployment and greater accessibility to research equipment.

## Acknowledgements

We would like to take this opportunity to thank all authors for their contributions and our reviewers for their efforts in reviewing the manuscripts. We also thank the journal’s former Editor-in-Chief Professor Fred Phillips, for his supportive guidance from the start, and Domingo Soriano for his timely support during the entire process. Marcel Bogers acknowledges the support of the Novo Nordisk Foundation (Grant No. NNF16OC0021630). Sandro Mendonça acknowledges the support, through BRU, of Fundação para a Ciência e a Tecnologia (FCT), grant UIDB/00315/2020; UIDB/05069/2020; PTDC/EGE-ECO/30690/2017; UECE-REM is also supported by Fundação para a Ciência e a Tecnologia (FCT).

## Bibliography

- Ahn, J.M., Lee, W., Mortara, L., 2020. Do government R&D subsidies stimulate collaboration initiatives in private firms? *Technol Forecast Soc Change* 151, 119840.
- Beck, S., Bergenholtz, C., Bogers, M., Brasseur, T.-M., Conradsen, M.L., Di Marco, D., Distel, A.P., Dobusch, L., Dörler, D., Effert, A., Fecher, B., Filiou, D., Frederiksen, L., Gillier, T., Grimpe, C., Gruber, M., Haeussler, C., Heigl, F., Hoisl, K., Hyslop, K., Kokshagina, O., LaFlamme, M., Lawson, C., Lifshitz-Assaf, H., Lukas, W., Nordberg, M., Norn, M.T., Poetz, M., Ponti, M., Pruschak, G., Pujol Priego, L., Radziwon, A., Rafner, J., Romanova, G., Ruser, A., Sauermann, H., Shah, S.K., Sherson, J.F., Suess-Reyes, J., Tucci, C.L., Tuertscher, P., Vedel, J.B., Velden, T., Verganti, R., Wareham, J., Wiggins, A., Xu, S.M., 2020. The open innovation in science research field: a collaborative conceptualisation approach. *Ind. Innovat.* 1–50. <https://doi.org/10.1080/13662716.2020.1792274>. Published online ahead of print.
- Bogers, M., Chesbrough, H., Moedas, C., 2018. Open innovation: research, practices, and policies. *Calif. Manage. Rev.* 60 (2), 5–16.

- Bogers, M., Zobel, A.-K., Afuah, A., Almirall, E., Brunswicker, S., Dahlander, L., Frederiksen, L., Gawer, A., Gruber, M., Haefliger, S., Hagedoorn, J., Hilgers, D., Laursen, K., Magnusson, M.G., Majchrzak, A., McCarthy, I.P., Moeslein, K.M., Nambisan, S., Pillier, F.T., Radziwon, A., Rossi-Lamastra, C., Sims, J., Ter Wal, A.L.J., 2017. The open innovation research landscape: established perspectives and emerging themes across different levels of analysis. *Ind. Innovat.* 24 (1), 8–40.
- Caraga, J., Lundvall, B.-Å., Mendonça, S., 2009. The changing role of science in the innovation process: from Queen to Cinderella? *Technol. Forecast. Soc. Change* 76 (6), 861–867.
- Cheah, S.L.-Y., Ho, Y.-P., 2020. Effective industrial policy implementation for open innovation: the role of government resources and capabilities. *Technol. Forecast. Soc. Change* 151, 119845.
- Chesbrough, H., 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Press, Boston, MA.
- Chesbrough, H., Bogers, M., 2014. Explicating open innovation: clarifying an emerging paradigm for understanding innovation. In: Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New Frontiers in Open Innovation*. Oxford University Press, Oxford, pp. 3–28.
- Dahlander, L., Gann, D.M., 2010. How open is innovation? *Res. Policy* 39 (6), 699–709.
- De Jong, J.P.J., Kalvet, T., Vanhaverbeke, W., 2010. Exploring a theoretical framework to structure the public policy implications of open innovation. *Technol. Anal. Strategic Manag.* 22 (8), 877–896.
- De Marco, C.E., Martelli, I., Di Minin, A., 2020. European SMEs’ engagement in open innovation When the important thing is to win and not just to participate, what should innovation policy do? *Technol. Forecast. Soc. Change* 152, 119843.
- Heikkinen, I.T.S., Savin, H., Partanen, J., Seppälä, J., Pearce, J.M., 2020. Towards national policy for open source hardware research: the case of Finland. *Technol. Forecast. Soc. Change* 155, 119986.
- Jugend, D., Fiorini, P.D., Armellini, F., Ferrari, A., 2020. Public support for innovation: a systematic review of the literature and implications for open innovation. *Technol. Forecast. Soc. Change* 156, 119985.
- Leckel, Anja, Veilleux, Sophie, Dana, Léo-Paul, 2020. Local Open Innovation: a means for public policy to increase collaboration for innovation in SMEs. *Technol. Forecast. Soc. Change* 153, 119891.
- Lee, Sungjoo, Lee, Hakyoon, Lee, Changyong, 2020. Open innovation at the national level: towards a global innovation system. *Technol. Forecast. Soc. Change* 151, 119842.
- Martin, B.R., 2012. The evolution of science policy and innovation studies. *Res. Policy* 41 (7), 1219–1239.
- Martin, B.R., 2019. The future of science policy and innovation studies: some challenges and the factors underlying them. In: Simon, D., Kuhlmann, S., Stamm, J., Canzler, W. (Eds.), *Handbook On Science and Public Policy*. Edward Elgar, Cheltenham, UK, pp. 523–542.
- Masucci, M., Brusoni, S., Cennamo, C., 2020. Removing bottlenecks in business ecosystems: the strategic role of outbound open innovation. *Res. Policy* 49 (1), 103823.
- Mendonça, J., Reis, A., 2020. Exploring the mechanisms of gender effects in user innovation. *Technol. Forecast. Soc. Change* 155, 119988.
- Oguguo, Prince C., Freitas, Bodas, Maria, Isabel, Genet, Corine, 2020. Multilevel institutional analyses of firm benefits from R&D collaboration. *Technol. Forecast. Soc. Change* 151 (C), 119841.
- Pustovrh, A., Rangus, K., Drnovšek, M., 2020. The role of open innovation in developing an entrepreneurial support ecosystem. *Technol. Forecast. Soc. Change* 152, 119892.
- Randhawa, K., Wilden, R., Hohberger, J., 2016. A bibliometric review of open innovation: setting a research agenda. *J. Prod. Innovat. Manag.* 33 (6), 750–772.
- Rosa, Adriano Carlos Moraes, Mello, Carlos henrique Pereira, Chimendes, Vanessa Cristhina Gatto, Amorim, Gabriela Fonseca, 2020. Measuring open innovation practices in small companies at important Brazilian industrial centers. *Technol. Forecast. Soc. Change* 151 (C), 119805.
- Santos, A.B., 2016. Degree of openness in public policies: a conceptual proposal. In: Martins, J., Molnar, A. (Eds.), *Handbook of Research on Innovations in Information Retrieval, Analysis, and Management*. IGI Global, pp. 451–487.
- Silva, S.E., Venâncio, A., Silva, J.R., Gonçalves, C.A., 2020. Open innovation in science parks: the role of public policies. *Technol. Forecast. Soc. Change* 151, 119844.
- Vanhaverbeke, W., Chesbrough, H., West, J., 2014. Surfing the new wave of open innovation research. In: Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New Frontiers in Open Innovation*. Oxford University Press, Oxford, pp. 281–294.
- Vicente-Saez, R., Gustafsson, R., Van den Brande, L., 2020. The dawn of an open exploration era: emergent principles and practices of open science and innovation of university research teams in a digital world. *Technol. Forecast. Soc. Change* 156, 120037.
- Vlaisavljevic, Vesna, Medina, Carmen Cabello, Van Looy, Bart, 2020. The role of policies and the contribution of cluster agency in the development of biotech open innovation ecosystem. *Technol. Forecast. Soc. Change* 155 (C), 119987.
- West, J., Bogers, M., 2014. Leveraging external sources of innovation: a review of research on open innovation. *J. Prod. Innovat. Manag.* 31 (4), 814–831.
- West, J., Salter, A., Vanhaverbeke, W., Chesbrough, H., 2014. Open innovation: the next decade. *Res. Policy* 43 (5), 805–811.
- Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. *J. Manage.* 37 (4), 1019–1042.

Antonio Bob Santos<sup>a\*</sup>, Marcel L.A.M. Bogers<sup>b</sup>, Maria Theresa Norn<sup>c</sup>,  
Sandro Mendonça<sup>d</sup>

<sup>a</sup> ANI – National Innovation Agency, Portugal

- <sup>b</sup> Eindhoven University of Technology; University of Copenhagen; University of California, Berkeley, Portugal
- <sup>c</sup> Aarhus University, Department of Political Science, Portugal
- <sup>d</sup> Instituto Universitário de Lisboa (ISCTE-IUL), Business Research Unit (BRU-IUL); ISEG/ULisboa, REM-UECE; SPRU, University of Sussex, Portugal

\* Corresponding author.  
E-mail addresses: [antonio.santos@ani.pt](mailto:antonio.santos@ani.pt) (A.B. Santos), [m.l.a.m.bogers@tue.nl](mailto:m.l.a.m.bogers@tue.nl) (M.L.A.M. Bogers), [mtn@ps.au.dk](mailto:mtn@ps.au.dk) (M.T. Norn), [sfm@iscte-iul.pt](mailto:sfm@iscte-iul.pt) (S. Mendonça).